CLAIM AMENDMENTS

1. (Original) A photoacoustic spectroscopy sample array comprising:

a substrate;

at least one affinity mass connected to the substrate; and

at least one acoustic detector acoustically connected to the sample array for receiving acoustic signals from the at least one affinity mass.

2. (Original) The sample array of claim 1, wherein the affinity mass is contained in a recess formed in the substrate.

3. (Original) The sample array of claim 1 further comprising a reflective coating on the substrate, wherein the reflective coating is transmissive to acoustic waves and reflects light beams.

4. (Original) The sample array of claim 1, wherein the acoustic detector comprises a transducer.

5. (Original) The sample array of claim 4, wherein the transducer is a thin-wall tube transducer.

6. (Original) The sample array of claim 4, wherein the transducer has a cross-sectional area that is less than or equal to an irradiated cross-sectional area of an affinity mass.

7. (Original) A microarray plate for PAS analysis comprising:

a body having multiple affinity masses capable of retaining specific analytes; and

at least one acoustic detector positioned adjacent each affinity mass to detect acoustic signals that emanate from an analyte retained by the adjacent affinity mass.

8. (Original) The sample array of claim 7 further comprising a reflective coat connected to the body, wherein the reflective coat is transmissive to acoustic waves and reflects light beams.

9. (Original) A sample array for PAS analysis comprising:

a body having multiple affinity masses for holding multiple samples for PAS analysis; and

means for detecting acoustic signals that emanate from the multiple samples in the multiple affinity masses, wherein the means for detecting acoustic signals is connected to the sample array.

10. (Original) The sample array of claim 9, wherein the affinity masses are contained in recesses formed in or connected to the body, wherein the affinity masses have affinities for at least one analyte of interest to be analyzed by PAS.

11. (Original) The sample array of claim 10 further including means for reflecting light away from the means for detecting acoustic signals.

12. (Original) A sample array for PAS analysis comprising:

a body having an upper surface and a lower surface;

at least one affinity mass formed on the upper surface for holding a sample for PAS analysis;

a reflective coat connected to the lower surface for reflecting light beams that pass through the at least one affinity mass; and

an acoustic detector positioned to detect acoustic signals that emanate from the sample in the at least one affinity mass.

13. (Original) The sample array of claim 12, wherein an acoustic detector is positioned adjacent each affinity mass to detect acoustic signals that emanate from the adjacent affinity mass.

14. (Original) The sample array of claim 12, wherein the acoustic detector is air-coupled to the sample array.

15. (Original) A PAS sample array comprising:

a support having affinity masses for retaining a solvent containing an analyte, the affinity masses arranged in an n, m matrix, wherein n and m are whole numbers from about 2 to about 2000; and

at least one acoustic detector positioned to receive acoustic signals from the analyte in at least one affinity mass.

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16. (Original) A sample array comprising:

a substrate;

at least one affinity mass in a recess formed in the substrate, the affinity mass having a specific affinity for an analyte to be detected by PAS analysis; and

at least one acoustic detectors fixed to the substrate to receive acoustic signals from an analyte in the at least one affinity mass.

17. (Original) The sample array of claim 16, wherein the acoustic detector comprises a transducer.

18. (Original) The sample array of claim 17, wherein the transducer is a contact transducer.

19. (Original) The sample array of claim 16, wherein an acoustic detector is aligned beneath each affinity mass.

20. (Original) A sample array for PAS analysis of analytes in a solvent, the sample array comprising:

a substrate having at least one recess containing an affinity mass having an affinity for one or more analytes;

a reflective coat on the substrate for reflecting light beams that pass through the at least one affinity mass and transmitting acoustic signals emanating from the one or more analytes in the affinity mass; and

at least one detector positioned by each recess capable of detecting acoustic signals that emanate from at least one analyte in the affinity mass.

21. (Original) A photoacoustic spectroscopy sample array comprising:

a body;

at least one affinity mass formed by masking and etching a thin film formed on the body; and

at least one acoustic detector acoustically positioned adjacent each affinity mass.

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22. (Original) A PAS sample array for analyzing multiple samples by PAS, comprising:

a substrate;

at least two rows of affinity masses supported by the substrate, the affinity masses retaining the multiple samples; and

an acoustic detector fixed to each row of affinity masses on the substrate capable of receiving acoustic signals from a sample in an affinity mass in a respective row of affinity masses.

23. (Original) The sample array of claim 22, wherein the acoustic detector comprises a transducer.

24. (Original) The sample array of claim 22, wherein the acoustic detector comprises a thin-wall tube transducers.

25. (Original) The sample array of claim 23, wherein the transducer is a contact transducer.

26. (Original) The sample array of claim 23, wherein the transducer is are air-coupled to the sample array.

27. (Original) A photoacoustic spectroscopy sample array, comprising:

a body;

at least one affinity mass connected to the body;

a sealing plate for sealing the affinity mass on the body; and

at least one acoustic detector acoustically connected to the sample array.

28. (Original) A PAS sample array comprising:

a substrate having multiple affinity masses formed thereon for retaining an analyte, the affinity masses arranged in an n, m matrix, wherein n and m are whole numbers from about 2 to about 2000; and

at least one transducer connected to the substrate adjacent each affinity mass to receive an acoustic signal from an analyte retained by the adjacent affinity masses.

29. (Original) A photoacoustic spectroscopy sample array, comprising:

a body;

at least one affinity mass formed on the body;

at least one transducer acoustically connected to the at least one affinity mass; and

an amplifier attached to the at least one transducer.

30. (Original) The sample array of claim 29, wherein the at least one affinity mass is deposited into a recess formed in the body.

31. (Original) A sample array for retaining at least one analyte for PAS comprising:

a substrate having a matrix of affinity masses formed on the substrate, wherein the affinity masses have a specific affinity for the at least one analyte; and

a thin-wall tube transducer positioned adjacent each affinity mass capable of receiving acoustic signals from the at least one analyte and converting the acoustic signals into electrical signals.

32. (Original) The sample array of claim 31, wherein the thin-wall tube transducers are positioned beneath the substrate.

33. (Original) The sample array of claim 31 further comprising a reflective plate positioned between the substrate and the thin-wall tube transducers.

34. (Original) A PAS sample array comprising:

a substrate having an upper surface and a lower surface;

an array of affinity masses connected to the upper surface of the substrate;

a reflective plate connected to the lower surface of the substrate; and

a base plate having an array of acoustic detectors connected thereto, wherein the base plate is positionable beneath the substrate such that each acoustic detector of the array connected to the base plate is positioned below an affinity mass, wherein each acoustic detector can receive acoustic signals emitted from an analyte retained in a respective affinity mass.

A1 Cont'd

35. (Original) A sample array assembly for retaining multiple samples for PAS analysis comprising:

a microarray plate having multiple affinity masses for retaining samples for PAS analysis;

a reflective plate connectable to and separable from the microarray plate, wherein the reflective plate is transmissive to acoustic waves and reflects light beams; and

a base plate connectable to and separable from the microarray plate and or the reflective plate, the base plate including multiple acoustic detectors alignable with the multiple affinity masses of the microarray plate.

36. (Original) The sample array of claim 35, wherein the affinity masses are contained in recesses formed in the microarray plate.

37. (Original) A method for speciating and quantifying analytes in a solvent, the method comprising:

providing a sample array having at least one affinity mass affixed thereto, the affinity mass retaining a solvent;

exposing the affinity mass to an intermittent light beam optically directed to illuminate analytes in the solvent;

placing at least one acoustic detector adjacent the sample array; and

detecting acoustic signals generated by analytes in the solvent as the solvent is exposed to the intermittent light beam.

38. (Original) A method for PAS analysis of analytes in a solution, the method comprising:

providing a sample array having a matrix of at least three affinity masses;

exposing the affinity masses to the solution such that the affinity masses retain the analytes in the solution;

exposing the affinity masses to a light beam to cause analytes retained by the affinity masses to emit acoustic signals;

placing at least one acoustic detector adjacent the sample array; and

detecting the acoustic signals generated by analytes retained by the affinity masses.

39. (Original) The method of claim 38, wherein the step of detecting the acoustic signals comprises detecting acoustic signals emanating from each affinity mass with separate transducers.

40. (Original) A method of analyzing samples containing analytes of interest, the method comprising:

providing a sample array including at least three affinity masses attached thereto, the affinity masses retaining the analytes of interest; and

analyzing the analytes retained by the affinity masses of the sample array utilizing photoacoustic spectroscopy.

41. (Original) The method of claim 40, wherein the step of providing at least three affinity masses comprises photolithographically forming the at least three affinity masses on a support of the sample array.

42. (Original) A method of analyzing multiple solutions including analytes of interest, the method comprising:

providing a sample array having at least two affinity mass;

providing less than about 100 picoliters of the solutions in each of the at least two affinity masses; and

analyzing the analytes of interest in the at least two affinity masses utilizing photoacoustic spectroscopy.

43. (Original) A method for PAS analysis of analytes, the method comprising:

providing a sample array retaining multiple samples having analytes therein;

simultaneously exposing the samples to light beams to cause analytes in the samples to emit acoustic signals;

placing at least one acoustic detector adjacent each sample; and

simultaneously detecting the acoustic signals generated by analytes in the samples.

44. (Original) The method of claim 43, wherein the step of providing a sample array retaining multiple samples comprises providing a sample array having at least four affinity masses capable of retaining the samples when exposed to the samples.

45. (Original) A method for PAS analysis of analytes, the method comprising:

providing a sample array having multiple affinity masses capable of retaining analytes therein;

sequentially exposing each affinity mass to a light beam to cause analytes in the affinity mass to emit acoustic signals;

placing an acoustic detector adjacent the affinity mass prior to exposure of the affinity mass to the light beam; and

detecting the acoustic signals generated by analytes in the affinity mass immediately after the affinity mass is exposed to the light beam.

46. (Original) A method for PAS analysis of analytes, the method comprising:

placing a sample array retaining multiple samples having analytes therein, in a PAS system;

simultaneously exposing the samples to light beams to cause analytes in the samples to emit acoustic signals; and

simultaneously detecting the acoustic signals generated by analytes in the samples.

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47. (Original) The method of claim 46, wherein the multiple samples comprise affinity masses to retain the analytes.

48. (Original) A method for PAS analysis of analytes in a solution, the method comprising:

providing a single sample array having a matrix of at least two rows of affinity masses, each affinity mass retaining a solution for PAS analysis;

sequentially exposing the solutions in the at least two rows of affinity masses to light beams to cause analytes in the solutions to emit acoustic signals;

placing an acoustic detector at each row of affinity masses; and

sequentially by row detecting the acoustic signals generated by analytes in the solutions in the affinity masses.

49. (Cancelled).

50. (Original) A method for PAS analysis for at least one analyte comprising:

providing a substrate having at least three affinity masses formed thereon, wherein the affinity masses have specific affinities for at least one analyte;

substantially simultaneously exposing the at least three affinity masses to irradiation; and

substantially simultaneously detecting acoustic waves emanating from the at least three affinity masses to determine whether the at least one analyte is present in the affinity masses.

51. (Original) A method for PAS analysis of analytes in a solution, the method comprising:

providing a substrate having a matrix of at least four affinity masses connected thereto, the affinity masses having affinities for the solutions and or the analytes;

substantially simultaneously exposing the affinity masses to light beams to cause analytes to emit acoustic signals;

placing at least one acoustic detector adjacent each affinity mass; and

substantially simultaneously detecting the acoustic signals generated by analytes in the affinity masses.